

Designing the LiDAR Mission for Industrial Heritage: Cooperation Across the Fields

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Abstract. Heritage managers and digital documentarians may see the same subject, but observe it through a contrasting set of filters. The focus of this paper is to present an approach by which the capabilities of 3D digital documentation for preservation can be adapted to compliment the interests of cultural heritage management and the public it serves. The case study selected for this discussion is the Champion #4 Shaft-Rock house located near Painesdale, in the Upper Peninsula of Michigan. Management and interpretation of the Champion #4 is the responsibility of Painesdale Mine and Shaft Inc. (PM&S Inc.), the major stakeholder and owner of the site. Initial discussion with PM&S Inc. confirmed that while the organization lacked exposure to Virtual or Augmented Realities they consider digital presentation and marketing channels, including social media, necessary to their survival. PM&S also realizes that restoration and conservation efforts consume all monies received from membership donations and sales of ethnic cookbooks. The primary goal of this project is to assist PM&S Inc. in guiding a reality-based survey (e.g. laser scanning, photogrammetry, etc.) to collect data which may be formatted into digital products to educate the public and enhance the enjoyment, respect, and appreciation of the Champion Mine site. The project outlined in this paper will demonstrate the greater utility of integrating a cultural heritage management perspective, with the requirements of a digital survey when documenting industrial heritage resources.

The subject used for the study is a prominent landmark locally known as the “Champion #4 Shaft House”. Built to receive skips of ore from over 5000 feet underground, the shaft house is the oldest of four surviving examples, of its type, remaining from the 1840-1968 copper mining era. Painesdale Mine & Shaft Inc. provides public access to the ground floor however safety issues prohibit tours and interpretation of the upper regions of the structure. This paper will document the process of conducting a terrestrial LiDAR mission designed to collect interior and exterior three-dimensional (3D) data of the shaft house and process equipment. Data collected during the mission will be archived for documentation, preservation, archaeological study, and future production of media products for Heritage Interpretation.

Typically, civil engineering firms are contracted to plan and conduct laser scanning missions for heritage documentation and preservation. Generally, these firms are not connected to the mission statements or the public interpretation concerns of heritage managers who may be responsible for operation and promotion of the site being surveyed. While these engineering firms possess the equipment and expertise, they may lack awareness of how their method of data collection could impact new applications and distribution technologies being developed for the heritage sector. Heritage managers, on the other hand, may not be familiar with emerging technologies yet have the need to communicate the value and significance of their sites within the natural cultural setting and social context.

The process presented in this paper will serve as a model for engaging engineering and heritage professionals in designing comprehensive documentation and preservation experiences to positively influence visitor appreciation of the Champion #4 Mine Shaft-Rock house and similar heritage sites.

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Mark Dice has over 35 years experience in video media production and is pursuing a Master of Science in Industrial History and Archaeology degree at Michigan Technological University in Houghton, Michigan. He earned a BME in Music Education from Kansas State Teachers College Emporia, Kansas and launched a video production company in 1976. In 1982 Mark designed and built the first portable multi-camera production system for projecting live concerts and has participated in over 400 live events. Mark is researching ways data collected by laser scanning can be used to develop educational products for the enhancement of Heritage Tourism.

Timothy Goddard has fifteen years experience with geospatial technologies in archaeology and is writing a dissertation at Michigan Technological University's PhD program in Industrial Heritage and Archaeology. Tim received his Bachelor's degree in Anthropology from the University of Arizona, Master's in Applied Anthropology (Historical Archaeology emphasis) and Certificate in Historic Preservation from the University of Maryland-College Park.. Tim is integrating GPS/GIS, total station, remote sensing, database design, virtual reality, field data collection, and network design into the work processes of archeological, biological, and environmental safety. Tim is a second generation archaeologist, merging spatial technology with archaeology methodology for heritage applications.

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